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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 10 November 1998 with an application for Letters Patent number 332735 made by RESENE PAINTS LTD.

Dated 7 December 1999.

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

Neville Harris
Commissioner of Patents

332735

Patents Form No. 4 Our Ref: JC211099

Patents Act 1953

PROVISIONAL SPECIFICATION

AN IMPROVED METHOD OF PACKAGING SOLVENT OR WATER BASED FORMULATIONS

We, **RESENE PAINTS LIMITED**, a New Zealand company, of 32-50 Vogel Street, Naenae, Lower Hutt, New Zealand do hereby declare this invention to be described in the following statement:

PT0436159

AN IMPROVED METHOD OF PACKAGING SOLVENT OR WATER BASED FORMULATIONS

Field of the Invention

The present invention relates generally to a method of packaging water or solvent based formulations, such as paints, resins and glues. In particular the present invention relates to a method of packaging such formulations which minimises skinning of the formulation on the internal surfaces of containers in which the formulation is stored.

Background

It is known to store water-based or solvent based formulations in containers. Such containers have a lid or sealing means to isolate the formulation from the surrounding atmosphere.

Commercially available paints are generally stored in a number of different sized containers. The container size may range from ten millilitres through to 50,000 litres.

Paint containers which contain approximately 1 litre through to 50,000 litres of a paint formulation are vulnerable to the forming of a skin on the internal surfaces of the container upon storage. The skin is a film of paint which is in contact with the lid and typically the upper internal side of the paint container. The skinning of paints in paint containers is a recognised problem in the industry and occurs in containers made out of plastics or metals. If the skinning is quite considerable it may be necessary in some instances to sieve the paint formulation to remove the skin prior to using the paint.

The skinning of paint is particularly pronounced when paint containers are stored under varying external temperature conditions. The occurrence of skinning has been found to be more prevalent during the warmer conditions of summer.

It is an object of the present invention to alleviate some of the skinning difficulties experienced in the paint industry, or to at least provide the public with a useful choice.

Summary of the Invention

The present invention provides a container, the container being adapted to contain a water based or solvent based formulation, the container including

- a sealing means comprising an anti-skinning layer located between the internal surface of the sealing means and the formulation.

Preferably, the anti-skinning layer is textured.

Preferably, the anti-skinning layer is porous.

Preferably, the anti-skinning layer is a gauze or a foam lining.

Preferably the gauze lining has insulative properties.

Preferably, the anti-skinning layer is further sprayed with an antiskin spray.

Preferably, the anti-skinning layer is located on the internal surface of the sealing means.

Preferably, the container contains approximately 1 litre to 50,000 litres of formulation.

Preferably, the sealing means is a lid.

Preferably, the lid is resealable.

Preferably, the water based or solvent based formulation is a paint, such as a latex based paint, an alkyd paint, a flat, a satin, a semi-gloss or a gloss paint, a varnish, a lacquer, a glue or resin such as PVA™, a resin emulsion or a water based ink.

In a further aspect of the present invention there is provided a method of preventing skin formation on a water based or solvent based formulation, the method including the steps of

- placing the water based or solvent based formulation in a container as described above, and

- locating an anti-skinning lining between the internal surface of a sealing means and the formulation.

Preferably, the antiskinning layer is textured.

Preferably, the anti-skinning layer is porous.

Preferably, the anti-skinning layer is a gauze or a foam lining.

Preferably the gauze lining has insulative properties.

Preferably, the anti-skinning layer is further sprayed with an antiskin spray.

Preferably, the anti-skinning layer is located on the internal surface of the sealing means.

Preferably, the container contains approximately 1 litre to 50,000 litres of formulation.

Preferably, the sealing means is a lid.

Preferably, the lid is resealable.

In a further aspect of the present invention there is provided a sealing means, the sealing means being adapted to substantially control skinning of water based or solvent based formulations, in which the sealing means comprises an anti-skinning lining, and in which the lining is secured proximate to the inner surface of the lid.

Preferably, the anti-skinning lining is approximately 0.001 millimetres to 5 centimetres thick.

Preferably, the anti-skinning layer is textured.

Preferably, the anti-skinning lining is porous.

Preferably, the porous lining is a gauze or a foam layer.

Preferably, the gauze or foam layer is sprayed with an antiskin spray.

Preferably, the anti-skinning layer is located on the internal surface of the sealing means.

Preferably, the anti-skinning lining covers substantially the entire surface area of the internal surface of the sealing means.

Preferably, the sealing means is a lid.

Preferably, the lid is resealable.

Further aspects of the present invention will become apparent from the following description given by way of example and with reference to any one of the following figures, in which:

Figure 1 illustrates a container adapted to contain a water or solvent based formulation and a lid means comprising a lid liner.

Figure 2 illustrates the internal surface of a lid means including a lid liner.

Detailed Description of the Invention

A solvent or water based formulation container 1 is illustrated in Figure 1. The container preferably, comprises substantially upright walls 2 and a base means 3. A water based or solvent based formulation 4 is contained within the container. Preferably, the formulation substantially fills the container. The container may be adapted to contain approximately 1 litre to 50,000 litres of formulation 4.

A lid means 5 is adapted to cover the formulation 4 in the container 1 and to substantially exclude access of the external atmosphere into the internal compounds of the container. Preferably, the container lid is adapted to be substantially airtight when the lid means is located securely on the container.

A lid lining 6 is illustrated in Figure 1. The lid lining 6, preferably substantially covers the entire internal surface of the lid means. In some

instances there may be an ullage, 7, between the formulation 4 and the lid liner 6.

In Figure 2 the inner surface of the lid 5 is illustrated with a covering liner 6.

During storage of containers of formulations of solvent or water based mixtures, the container 2, the formulation 4, the ullage 7 and the lid means 5 all form part of a system which is vulnerable to temperature changes. When the surrounding environment of the container is constant, the temperatures of the container, the formulation and the ullage space is substantially equal to the temperature of the external environment. The vapour arising from the formulation is maintained in the ullage space between the internal surface of the lid and the body of the formulation. It has been established that no skinning occurs under conditions whereby the temperature of the container, the body of the formulation and ullage space are at equilibrium. To maintain such a temperature equilibrium from filling the container to storage and ultimately to just prior to the use of the formulation would require very expensive atmospheric control means.

However, when the temperature of the external environment increases, for example where the container is sitting in sunlight, the external surface of the container and lid can increase while the corresponding temperature of the formulation within the container, the vapour in the ullage 7, and the lid surface can be substantially different. The temperature of the lid 5 and the adjacent formulation vapour in the ullage 7 increases in temperature more quickly than the body of the formulation 4. A temperature gradient is created between the lid and the body of the formulation.

It has been established that under conditions of storage of containers 1 where the temperature of the external atmosphere is not maintained at a steady state, the formulation has a tendency to skin proximate to the lid of

the container. This is thought to arise because of the temperature gradient and thereby concentration gradient of vapour existing between the lid and the formulation.

In order to minimise the concentration and temperature gradient arising under conditions whereby the external temperature of the container 1 is not maintained at a constant rate, it has been found that the incorporation of a porous or foam-like layer of approximately 1 to 5 mm either suspended between the lid and formulation or located on the internal surface of the lid can control skinning. The results of a particular experiment illustrating the effects of the skinning control measures achieved from various linings are illustrated in the following examples.

Example 1 – Pails of water based high solids acrylic undercoat were placed in an incubator at 40°C for one day. The initial temperature of the containers was conditioned to 24°C. The container contained 10 litres of formulation. A container, comprising a non-lined lid was used as a reference. The amount of skin formed in the reference container was 11.2 grams. The degree of skinning was determined by removing the skin off the lid with a soft brush under water into a 500 μm test sieve. The skin which was collected was spun dry, weighed and bottled for future reference.

The lid liners that were compared are illustrated in the following table.

Lid Lining Means	Skin Percentage
Untreated container (reference)	100%
Plastic sheet lid liner[1]	38%
An antiskin spray treatment[2]	39%
Antiskin spray[3] and porous or plastic sheet liner	5%
Container insulation[4]	22%
Internal polystyrene float	17%

Fibreglass gauze on lid	3%
Gauze and spray	1%
Insulation, gauze and spray	1%

[1] The single ply plastic sheet tested was 75 micron polyethylene, 75g per square metre per ply.

[2] An antiskin spray was applied to the internal surface of the lid, the useful thickness of which is from tens of microns to 1 nanometre in thickness.

[3] The antiskin spray employed comprised either oils, mono or polyhydric alcohols or a wide range of oligomers.

[4] Insulation means included the likes of cardboard, paper, cardboard laminated with aluminium foil, bubble wrap and aluminium foil, fibreglass laminated with aluminium foil.

Example 2 – As in Example 1 a test with the plastic sheet was repeated. In this instance the plastic sheet (1 or 2 ply) was suspended between the lid and the formulation surface. With 1 ply the skinning reduced to 20% and with 2 ply to slightly less than 20%.

Example 3 – As in Example 1 a nylon gauze of 200 micron hole size, 230 micron gauze thickness and 100g per square meter was fixed against the lid of a container. The nylon gauze layer was attached to the inner surface of the lid using hot melt adhesive. There was a gap of approximately 0.5 to 1mm between the gauze and the lid. This gap and gauze was observed to retain significant amounts of paint approximately 1-3mm. The skinning results were reduced to approximately 3%.

Example 4 – As in Example 3, spun glass fibre felt of 500 microns thick and 160g per square meter was attached with hot melt adhesive to the lid. The skinning results were reduced to approximately 3%.

Example 5 – A polystyrene float of 2.5 cm thick and 360g per square meter was cut out to substantially cover the surface of the formulation. The float was substantially immersed in the formulation and allowed to float on the top surface of the formulation. The skinning results were reduced to approximately 3%.

The examples illustrate that the combinations of control measures provide substantial improvements in skinning control. The combination of an antiskin spray treatment and liner was more effective than either measure alone.

All the measures tested resulted in significantly less skin formulation arising from the formulation compared to the untreated container.

It is envisaged that an injection moulded plastics lid comprising a series of dimples or convex protrusions may also provide a textured inner surface on the lid suitable to reduce skinning.

It is an advantage of the present invention that the degree of skinning on formulations of water based or solvent based products may be substantially controlled.

Where in the foregoing description reference has been made to integers or components having known equivalents, then such equivalents are herein incorporated as if individually set forth.

Although the invention has been described by way of example and with reference to possible embodiments it is to be appreciated that improvement and/or modifications may be made to these embodiments without departing from the scope of the invention.

RESENE PAINTS LIMITED

By Their Attorneys
BALDWIN SHELSTON WATERS

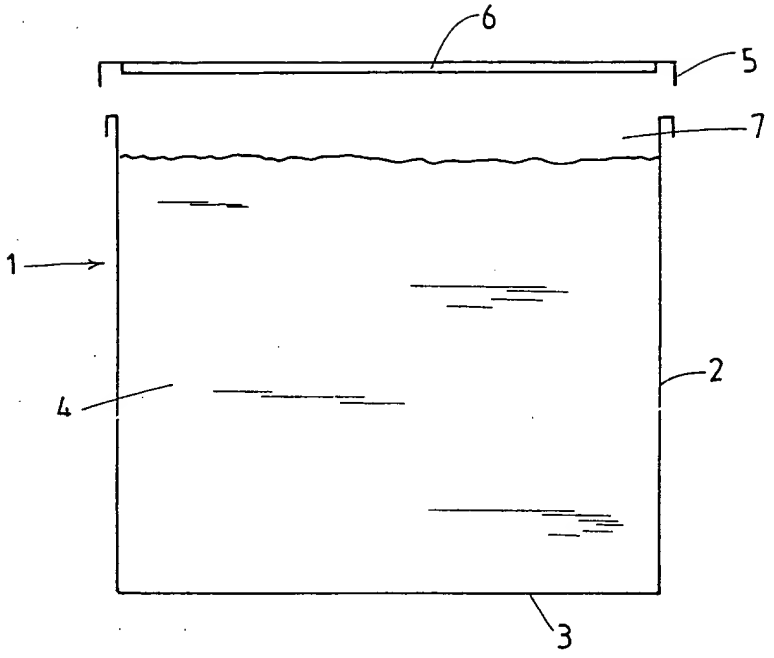

FIG.1

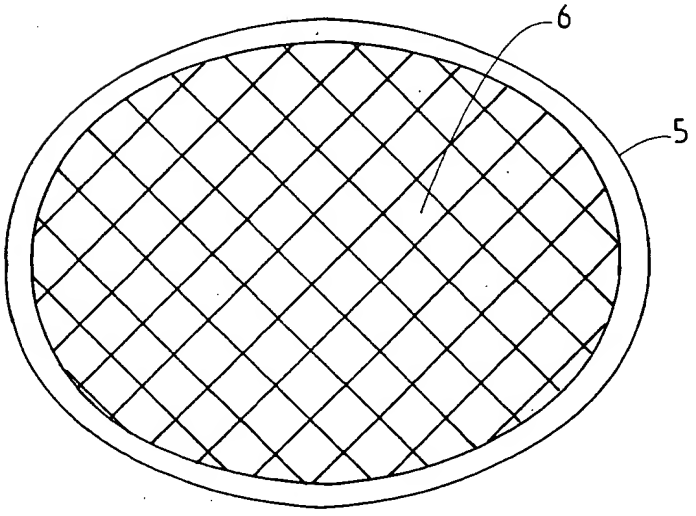

FIG. 2